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Notes on Injurious Southwestern Tenebrionidae (Col.).

By ROY E. CAMPBELL, U. S. Bureau of Entomology, Alhambra, California.

Several species of small tenebrionid beetles at various times have been observed causing damage to young plants in California. Every year complaints come from new and widely-separated localities, indicating either that the insects are becoming more injurious, or that the continued increase of cultivated crops has removed the native plants on which the beetles fed, compelling them to seek food on the crops. The damage is invariably caused by the adults feeding on the stems of young seedlings, such as peppers and lima beans as they are coming out of the ground, or by girdling the stems of tomatoes and peppers after they are transplanted.

Most of the species found belong to the genus *Blapstinus,* but the genera *Coniontis* and *Ulus* are also represented.

Wade[1] has observed in the semi-arid regions of the Middle West and West, where the larvae of several genera of Tenebrionidae, among them *Blapstinus,* are destructive to young wheat and other grains, that the insects occur most abundantly in sandy and sandy loam soil. In California, one species, *Ulus crassus* Lec[2] was found exclusively in such locations, usually near the edge of hills, or washes which had in time past been overflowed. *Blapstinus rufipes* Csy. and *B. dilatatus* Lec. have been taken both in sandy loam soil, and also in heavy, cloddy soils, while *Blapstinus coronadensis* Blaisd. and the species of *Coniontis* have been observed only in heavy soils.

In commenting on the work of *B. dilatatus* and *B. coronadensis* on transplanted pepper plants, Dr. F. E. Blaisdell says: "I believe that cloddy ground is favorable to the breeding and hiding of these small tenebrionids. In Contra Costa County, near San Francisco Bay, I have noticed the same thing—there it is *B. elongatus* Csy. that does the mischief."

W. B. Parker observed *Blapstinus* sp. at Perkins and Hamilton City in 1912 damaging young sugar beets. The plants were injured at the surface of the soil, and while they were not cut off, were chewed until many died.

In 1913 Vaile[3] reported that 100 acres of lima beans were severely damaged by *Coniontis subpubescens* Lec.[4] near Ventura. The beetles fed on the young plants just after they came up. He also said that *Blapstinus* sp. had been reported in previous years, but had not done as much damage as *Coniontis.* Poisoned baits, as applied for cutworms, killed many of the beetles, according to his observations, and such control was

[1] Wade, J. S. Notes on Ecology of Injurious Tenebrionidae, Ent. News, Vol. 32, No. 1, 1921.

[2] The writer is indebted to Dr. F. E. Blaisdell for identification of most of the species mentioned herein.

[3] Vaile, R. S. A tenebrionid beetle Injuring Beans, Monthly Bull. Cal. State Com. Hort. Vol. 11, page 591, 1913.

[4] Specimens collected by Graf near Ventura at this time were later identified by Dr. Blaisdell as *Coniontis muscula,* and this probably is the species to which Vaile refers.

recommended. *C. subpubescens* was collected by J. E. Graf in sugar beet fields near Compton in 1915. In 1918 *Coniontis muscula* Blaisd. was taken by H. J. Ryan at Santa Paula, Ventura County, where it was damaging young beans. About the same time *Coniontis globulina* Blaisd. was observed by the writer in a 50-acre tomato field along the coast near Oxnard. The beetles fed mostly on the stems, and to some extent on the foliage. More than half of the plants were killed, necessitating replanting. Feeding was also observed on young beets and lima beans.

During the years 1915 to 1919, C. F. Stahl observed *B. rufipes* in sugar beet fields of San José. Large numbers of beetles fed on young beets just after they came up, and often destroyed fields of ten acres or more. The growers reported successful control by the use of poisoned bait.

In Orange County about 3,000 acres of peppers are raised annually. The various fields are mostly in a well-settled section, surrounded by citrus and walnut orchards, and have been cultivated for a number of years. The soil is a light sandy loam. In 1918 *B. rufipes* and *B. dilatatus* were numerous in many of these pepper fields. The beetles fed on tiny plants and cut them off as they were coming out of the ground. Damage continued until the remaining plants were 3 or 4 inches high. All feeding was done on the stems at the surface. An average of 20 per cent of the plants in the districts was destroyed and several fields required replanting. The beetles had been observed by growers for several previous seasons, but to a much less extent. In the same year *B. rufipes* fed extensively on young sugar beets in several fields in Ventura County. One 60-acre field was so badly damaged that it was plowed up. In 1919 and other years recently, the same species is reported to have caused considerable damage to young tomato plants in the San Francisco Bay region, where in many of these fields considerable replanting was required. In 1921, *B. coronadensis* and *B. dilatatus* were very numerous in several fields of bell peppers in Orange County. These also fed on the stems of the plants after the latter had been transplanted into the field, and

in many cases completely girdled the stem. In the worst infested part of the field, as high as 25 per cent of the plants were finally killed, but the field in general suffered less than 5 per cent.

The pepper field in which the beetles were most numerous was at the mouth of a small valley, and had been farmed to irrigated crops for five years. Adjoining this field was a young lemon orchard which had been kept in clean culture during the summers, and in vegetables during the winters. Between the two fields was a dirt farm road which had not been previously plowed for several years. By far the greatest damage, as well as the most beetles, was in the rows near this old road. The soil was a heavy clay loam. A similar, but less severe infestation was in another field about a half mile distant at the top of a hill 100 feet higher.

Recently reports have been received from San Bernardino County that young potatoes near Colton had been injured by *B. coronadensis*. Over 600 acres were injured, and several fields entirely destroyed. In May, 1922, 90 per cent of the plants in a 7-acre field of tomatoes near Covina (Los Angeles County) were destroyed by this species inside of two days after planting.

In 1918, DeOng[5] reported a series of *Blapstinus* causing serious damage of a similar sort to young castor beans in southern California.

In 1919, Vorhies[6] reported that a small beetle, provisionally classified as *Blapstinus pimalis* Csy., destroyed cotton plants on the Mesa Experiment Farm, Arizona, by feeding just below the surface of the soil on the seedlings as they emerged from the ground. The plot was so badly damaged as to require replanting. It had been fertilized with cottonseed meal, and as the beetles fed so readily on crushed cotton seeds and lint, it appeared probable that they had been attracted to the field by the cottonseed meal. Irrigation of the affected area was

[5] DeOng, E. R., Jr. Econ. Ent. Vol. II, p. 480, 1918.

[6] Vorhies, C. T., 30th Annual Rept. Arizona Agr. Exp. Sta., p. 347, 1919.

effective in preventing damage to the replanting, and was suggested as a proper control measure.

In tests conducted by the writer, many *Blapstinus* after being submerged in water for periods up to 18 hours, were still alive and recovered on being removed from the water.

Ulus crassus Lec. was first observed in 1918 associated with and more abundant than the *Blapstinus* species which were feeding on the young peppers as they sprouted. They occurred in Ventura County, feeding on the lima beans as the latter appeared above ground. Also they exhibited similar habits on young melon plants grown on sandy soil near Los Angeles. On the melons, however, they fed on the stems of the plants, leaf stems, and to some extent on the foliage. In March, 1922, Mote[1] reported that practically all the tomato plants were girdled near the soil line in the Salt River Valley of Arizona. When the plant which the beetles girdle falls, they collect in the shade and feed on the remainder. The insects had not been observed in this district before, but were abundant the previous July in another district, where they attacked small seedling melon and pepper plants.

The feeding habits of these beetles are quite similar. They congregate in the soil about the plants, feeding mostly on the stems at the top of the ground, but to some extent, with *Ulus* and *Coniontis,* feeding on the leaves and leaf stems. The amount eaten by an individual beetle is small, but often such numbers feed on a single stem that it is either completely girdled or cut off. Often there will be a regular ring of beetles around one stem, and occasionally rings of several layers of beetles have been observed. As many as 26 *Ulus* were observed feeding on a single lima bean stem. Seventy-five *Blapstinus,* many of which were feeding, were counted in the soil immediately around the stem of a bell pepper plant. On the bell peppers, feeding appeared to be slow, and many times the wound would heal over; but often the girdled place was too large.

Feeding is mostly confined to the tender seedling plants, just as they come out of the ground; or to the tender stems of newly,

[1] Mote, Don C. Insect Pest Survey Bulletin, U. S. D. A., Vol. 2, No. 2, May, 1922.

set-out plants. After a week or more, when the stems begin to get tougher and harder, damage to the stems becomes less. Whether the insects breed in the fields where damage by the adults occurs is not known. From the fact that large numbers of beetles are found in the fields, feeding on seedling plants and in a few days, or a week's time, the number is often much lessened, the possibility of migration is suggested.

It has been observed that neglected fields or those in which straw, trash or other debris have accumulated are much more subject to infestation than fields on which clean culture has been practiced.

Control Measures

An early experiment with poisoned bran bait scattered along the rows in a field of peppers infested with *Blapstinus rufipes*, *B. dilatatus* and *Ulus crassus* was not effective. The weather was dry and the mash quickly became hard, in which condition it did not appear to be attractive to the beetles. During the present season, however, in a squash field infested by *B. coronadensis*, a handful or two of mash placed about each hill infested with from 30 to 75 beetles, killed between 70 to 90 per cent. of them. This mash apparently retained its attractiveness for at least a week. Poisoned bran mash has also been reported by Vaile to have been used successfully in Ventura County and by Stahl in Santa Clara County.

Laboratory tests with *Coniontis globulina* using tomato foliage sprayed with lead arsenate and Paris green killed the beetles in from one to five days, depending on the strength used. The beetles feed fairly freely on the poisoned foliage.

In the San Francisco Bay region, many tomato growers who have suffered damage in previous years, now make it a practice to wrap the stems of the plants just before they are set out. They use a soft paper, such as newspaper or tissue paper, cut in rectangles about 4 by 6 inches and wrap one tightly about the stem of each plant, from the cluster of roots to the lowest leaf. Planted thus, the stem is protected, and the growth is not hindered. In this district the poisoned bran mash has been used with success.

A number of experiments in fields of bell peppers from 6 to 8 inches high showed that if any fine dusty material, such as lime, tobacco dust or kaolin, is placed so as to entirely cover the ground immediately around the stems of the plants, feeding practically ceased. This work was done in fields of heavy soil, where the fine dust was able to penetrate the soil around the stem for a fourth- to a half-inch or more.

The lime was applied with a bellows duster. By using a wide-open feed and holding the discharge pipe close to the stem, it was possible to cover the ground completely on one side of the stem with a single puff of the bellows. By proceeding up a row, giving a puff to each plant, and then coming back along the same row, the circle of dust around the stem could be completed.

On the Synonymy of Polia nimbosa Guenée (Phalaenidae=Noctuidae, Lepid.).

By WM. BARNES and F. H. BENJAMIN, Decatur, Illinois.

Polia nimbosa Guenée.

1852, Gn., Sp. Gen., VI. Noct., II, 77, *Aplecta.*
1857, Walk., Cat. Lep. Het. B. M., XI, 555, *Eurois.*
1873. Grt., Bull. Buff. Soc. Nat. Sci., I. 102, *Mamestra.*
1875, Speyer, Stett. Ent. Zeit., XXXVI, 142, *Mamestra.*
1891, Sm., Proc. U. S. N. M., XIV, 204, pl. VIII, f. 3 valve ♂ genitalia, *Mamestra.*
1893, Sm., Bull. U. S. N. M., XLIV, 114, *Mamestra.*
1905, Hamp., Cat. Lep. Phal. B. M., V, 115, pl. LXXXI, f. 14, *Polia.*

race **mystica** Smith.

1898, Sm., Ent. News, IX, 242, *Mamestra.*
1905, Hamp., Cat. Lep. Phal. B. M., V, 115, pl. LXXXI, f. 15, *Polia.*

Examination of the male genitalia shows *nimbosa* and *mystica* to apparently represent a single species. In Manitoba and Alberta this species has the primaries more heavily powdered with brownish and brownish-fuscous than typical eastern *nimbosa.* To this race Dr. Smith applied the name *mystica.* Specimens from the mainland of British Columbia show a tendency to become paler; thus approaching eastern *nimbosa.*

race **mysticoides** nov.

Vancouver Island produces very pale specimens with the

primaries only slightly powdered with fuscous; appearing whitish. There is also a tendence for the t. a. and t. p. lines to become obsolescent below the median vein; whereas in typical *nimbosa* and race *mystica* the lines are usually well marked. The genitalia appear the same as those of *nimbosa* and *mystica*.

Type locality: Duncans, Vancouver Island, B. C., (Hanham).

Number and sexes of types: Holotype ♂, 9-VII-14; Allotype ♀, 3-VII-12; 2 ♂ Paratypes, 13-VII-12, 23-VII-10; 8 ♀ Paratypes, various July dates; 1 ♀ Paratype, no date.

Types in: Barnes Collection; 1 ♀ Paratype 15-VII-14, Canadian National Collection; 1 ♀ Paratype 20-VII-10, E. H. Blackmore Collection.

Three Supposed New Species of Ceraturgus (Diptera, Asilidae) from North Carolina.

By C. S. Brimley, Division of Entomology, N. C. Dept. of Agriculture, Raleigh, North Carolina.

In overhauling our species of this genus I find that we have three apparently new species in our collections; the descriptions follow.

Ceraturgus elizabethae n. sp.

Resembles *cruciatus* but is a little larger with the abdomen proportionately longer and more slender, and the antennae also longer. Differs from all our other species in having only one complete light pollinose cross-band on the abdomen.

♂. Black, face and cheeks golden yellow, pollinose, with a narrow black stripe down the center of the former, which is clothed with rather scant, long, black hairs, mystax black. Front and vertex black shining, the sides golden yellow, pollinose, as are also the posterior orbits. Antennae 6 mm. long, black, the fifth joint clothed with short dense black pile, the first joint longer than the second, the third more than twice as long as the first two together, the fourth very short, the fifth about as long as the third.

Thorax black with golden yellow, pollinose markings as follows: an elongate spot on the humeri, a similar spot extending from just in front of the transverse suture to some distance behind it, two dots on the suture near the middle, an elongate spot below the humeri, a dot above the base of each haltere, and

another above the hind coxae. Scutellum golden yellow, pollinose in the middle.

Wings smoky black, becoming hyaline towards the apex and on the posterior border.

Legs, the coxae mainly black with a pollinose spot on the hind pair, femora nearly black with a little yellow at the base of the middle and hind pairs and at the apex of the front and middle ones, tibiae and tarsi yellow, last joint of latter tinged more or less with dusky, front pulvilli black, the others yellow.

Abdomen with a narrow transverse band of golden yellow pollen on the apex of the first segment, and transversely elongate spots on the sides of the three following segments, these separated on the dorsum by more than their combined width, and decreasing in size posteriorly so that those on the sides of the fourth segment are barely perceptible: venter black.

Pile scantier everywhere than in *cruciatus,* that on the back of the head and at base of proboscis black, elsewhere varying shades of yellow. Length of body 17 mm.

♀. Similar to male, but pile of face and mystax scantier, and yellow in color instead of black. The elongate spot on the humeri unites with that at the suture and extends the whole length of the mesonotum. There is more yellow on the hind coxae and a yellow dot on the pleurae. All the femora yellow, the hind pairs darker, tibiae, tarsi and pulvilli all wholly yellow. Wings smoky all over, paler in the centers of the cells. Length 18 mm.

Two other females taken at Raleigh, June 21, 1922, by myself, and in late June, 1921, by T. B. Mitchell, are similar but have less yellow on the thorax and the yellow spots on the sides of the abdominal segments are lacking on the fourth in the first and on the third and fourth in the second specimen named.

Type male collected at Raleigh, North Carolina, June 16, 1922, by T. B. Mitchell. *Paratype* female taken *in coitu* with the type male.

Male type and female paratype will be deposited in the U. S. National Museum, female paratypes in our collection.

Named for my little friend, Elizabeth Dunn.

Ceraturgus mitchelli n. sp.

Gray or whitish, pollinose, with almost the entire vestiture white; resembles most closely Bach's description of *dimidiatus,* but differs in having only the front tibiae yellow and in having hyaline wings.

Black, face and cheeks whitish, pollinose, with long white hair, mystax white. Front dull whitish, pollinose, but black at base of antennae above and on a narrow stripe above this: ocellar area and occiput black, narrowly whitish, pollinose, on the sides, posterior orbits narrowly white, pollinose. Proboscis black, reddish at tip. Antennae about 4 mm. long, first and second joints about equal, third about twice as long as the first two together, fourth short, fifth about half as long as third, fourth and fifth covered with very short, dense, black pile, first and second with some long, white hairs. All the hair on the head white.

Thorax black with yellowish white pollen, this forming a broad stripe along each side of the mesonotum above the wing bases which unites with its fellow before the scutellum: two, narrow, submedian bands on the dorsum, broader in front, and a narrow line on the suture, the black consisting of a broad median longitudinal stripe, (faintly divided by a median line of whitish hairs) and two large rounded spots on the sides. Scutellum margined with whitish behind. Metanotum whitish pollinose on the sides. Pleurae black, extensively white, pollinose, but with one obliquely elongate spot of golden yellow pollen.

Legs, all the coxae whitish pollinose, all the trochanters and femora black, the front femora yellow at extreme tip, front tibiae and tarsi yellow with short yellow pile, the long hairs and bristles white, middle tibiae black, yellowish at base, middle tarsi black, yellowish beneath, hind tibiae black, yellowish at the knees, hind tarsi black above, slightly yellowish beneath. Front pulvilli black, the others yellow (as is also the case with the males of *cruciatus* and *elizabethae*). Claws black. Hairs and spines of the legs white, except that there are some black hairs and spines near the base of the hind femora and beneath the hind tarsi.

Wings hyaline, tinged with yellow in the costal region, veins blackish, except in the costal region where they are yellow.

Abdomen shining black with complete, moderately broad, white, pollinose crossbands on the apices of the first five segments, these produced forwards on the sides nearly or quite to the anterior margins, sixth segment with a triangular white pollinose spot on each side, seventh segment unmarked, a tuft of yellow hairs on each side of the hypopygium. Length of body 18 mm.

Type and only specimen taken at Swannanoa, North Carolina, May 26, 1923, by T. B. Mitchell for whom the species is named. Type will be deposited in the National Museum.

Ceraturgus mabelae n. sp.

Differs from the other species of the genus in having no black at all on the abdomen.

Dark brown, face and cheeks golden yellow, pollinose, mystax and beard yellow, front and occiput black, shining, narrowly golden, pollinose next the eyes, posterior orbits grayish pollinose, hairs of front, occiput and back of head black. Antennae about 3 mm. long, black, first and second joints subequal, third about one and one-half times as long as the first two together, fourth short, about as broad as long, broader at apex, fifth flattened, rather broad, tapering to the apex, clothed with short dense black pile. Hairs on the basal antennal joints black.

Thorax golden yellow, pollinose, with the usual broad, median dark stripe, and two large rounded dark spots on each side, scutellum and posterior part of mesonotum yellowish brown, the former golden yellow, pollinose, on the margin, a rounded golden yellow, pollinose spot on each side of the metanotum. Short hairs of the thoracic dorsum black, the long ones mainly yellow. Pleurae almost wholly golden, pollinose, this divided into spots by the sutures. Wings wholly hyaline. Legs dark yellowish brown, somewhat lighter on the front tarsi, all the coxae golden yellow, pollinose, hairs and spines of legs yellow.

Abdomen wholly yellowish brown above, each segment with a broad posterior band of golden pollen, the last three or four segments being almost wholly pollinose. Venter wholly yellowish. Length of body 12 mm.

Described from a single female collected in late May, 1920, at Linville Falls, North Carolina, by Franklin Sherman, Chief in Entomology. The type will be placed in the U. S. National Museum.

Resembles *nigripes* in size and *cruciatus* in shape.

Named for my young friend, Mabel Payne.

The following key appears to separate the species of *Ceraturgus* of which we have specimens or descriptions.

1. Abdomen without any black ..... *mabelae*
   Abdomen with black 2
2. Legs all black ..... *nigripes*
   Legs partly yellow or yellowish 3
3. None of the hair on the head black 4
   Some of the hair on the head black 6
4. Legs all yellow, body almost wholly golden yellow, pollinose, size small (length 8-9 mm.) ..... *aurulentus*

Legs largely black, size larger (length over 10 mm.) .. 5
5. Front tibiae yellow others black, wings hyaline. . *mitchelli*
Front and middle tibiae yellow, wings not hyaline *dimidiatus*
6. Only one complete light pollinose crossband on the abdomen, namely that on the first segment.... *elizabethae*
Several complete crossbands on abdomen 7
7. Beard and mystax yellow, size smaller ..... *similis*
Beard black, mystax often partly so ..... *cruciatus*

New Species and Forms of Lepidoptera (Heterocera).

By WM. BARNES and F. H. BENJAMIN, Decatur, Illinois.

Automeris zephyria form **zephyriata** nov.

Entirely similar to *zephyria* but with the fuscous tints of the primaries, secondaries, and thorax, largely replaced by deep rufous.

A. zephyria form *zephyriata* holds the same relative position to *zephyria* that *A. pamina* form *aurosca* holds to *pamina*. It apparently emerges as an uncommon form in bred lots. Intergrades occur.

Type locality: High Rolls, New Mexico, (Bonniwell).

Number and sexes of types: Holotype ♂, April; Allotype ♀, April; 4 ♂ Paratypes, March (1), April (2), July (1); 2 ♀ Paratypes, no date.

Epia jola sp. nov.

1913, B. & McD., Contr. Nat. Hist. Lep. N. A., II, No. 1, 14, pl. VI, f. 11, as *ectrapela, Epia.*

Primaries: ground color whitish, heavily overlaid by fuscous shades; basal line black, double, included space white, waved from costa to below cell, thence obsolete; its point of obsolescence being marked by a broken, basal, black dash; t. a. line black, double, included space white, strongly and obliquely excurved to claviform, thence drawn to a mesal point on vein 1, thence distally produced to a point below vein 1; claviform large, outlined and more or less filled in by black; orbicular outlined by black, white filled with a central fuscous shade; an oblique white shade from orbicular to near inner margin; reniform outlined by black, white filled, with a darker central crescent which has a whitish center; a waved, fuscous, median shade, connecting the reniform with the distal end of the claviform, and the inner margin; t. p. line produced to points on the veins, black, double, included space white, strongly excurved from costa to about vein 4, incurved to inner margin; s. t. space with a black patch on costa, and sagittate black dashes between veins 2-3, 3-4, 4-5; s. t. line inwardly oblique from costa to about vein 7, broken, again starting on vein 7 almost parallel to outer margin, pro-

duced on veins 3 and 4 forming a small W-mark; terminal space not intersected by black dashes; a terminal line of black crescents between the veins; fringe whitish-gray, interlined by fuscous.

Secondaries: fuscous, somewhat paler basally, veins darker, with discal spot and median shade.

Beneath: whitish, powdered by black; both pairs of wings with discal spots and darker outer margins; secondaries showing obscure median and s. t. shade lines, and with the discal spot often connected to the base by a bar of black scales. *Expanse*: 28-33 mm.

Allied to *minorata,* but lacking the strong brown tinges, with the s. t. space much wider, dashes in the s. t. space not obsolescent (as in the type male of *minorata,* Havilah, Calif., Hy. Edw. Coll.), besides possessing less strongly laminated and ciliated antennae in the male.

Perhaps more closely allied to *ectrapela,* but much more brightly marked. Compared with the series in the Smith Collection it seems quite distinct from the female type from Agnes Lake, British Columbia, and nearer to specimens labeled *minorata.*

It is possible that further specimens may show intergrades with true *ectrapela,* but twenty-two specimens from Utah, seem to present an almost uniform appearance. Seven specimens from Wallace, Idaho, received through the kindness of Messrs. Doll and Marloff, seem to be the same species, altho slightly darker than the Utah specimens. Genitalically there appears to be a slight difference between the Utah and Idaho specimens in the spinulation of the penis, but this is probably individual. In order to insure against a mixed series, the types are restricted to the following:

Type locality: Eureka, Utah (Tom Spalding).

Number and sexes of types: Holotype ♂, 1 July 1921; Allotype ♀, 1 July 1921; 8 ♂, 12 ♀, Paratypes, various dates from 21 June to 1 August.

Types in: Barnes Collection; Paratypes, Brooklyn Museum, Canadian National, Marloff and Spalding Collections.

Hyssia marloffi sp. nov.

Primaries: ground color violaceous-gray, powdered with black; basal line black, double, outwardly oblique from costa to radius, thence almost erect to median vein where it becomes obsolescent; t. a. line black,

double, outwardly oblique from costa, interrupted by a slight tooth above cell, inwardly oblique from submedian fold, produced to a long point below vein 1; median shade black, outwardly oblique from costa to inner margin; t. p. line black, double, produced to small points on the veins, excurved from costa to about vein 5, thence inwardly oblique, with a slight curvature, to inner margin; s. t. line marked on the costa by a black patch, thence as a pale diffuse shade, marked by small black dots, to inner margin; terminal line of black dots; basal-t. a. area heavily powdered with black, disconcolorous with the basal half of the median area; orbicular present but obsolescent, faintly outlined by a few black scales; reniform large, more or less kidney-shaped, yellowish, with somewhat darker central crescent, obscured on median vein by fuscous; cell between median shade and reniform filled in with black; a black dash connecting the reniform with the t. p. line; another black dash, in submedian fold, connecting the basal line with the t. a. line, thence often faintly marked to the median shade; fringe basally checkered by a line of whitish blotches.

Secondaries fuscous, somewhat paler basally; fringe white, with a fuscous interline.

Beneath: primaries suffused with fuscous, with t. a. line marked on costa, a black discal spot, and t. p. line reproduced as a black shade, terminal line and fringes as on upper side. Secondaries: suffused with fuscous, paler basally, with black discal spot and median shade line, fringes as on upper side. Some of the maculation on the under side may be lost by suffusion. *Expanse*: 25-28 mm.

According to specimens compared with the type of *H. fasciata* Smith, the present species is closely allied, by the black dash connecting the reniform with the t. p. line, but presents a considerably different habitus due to the primaries being more heavily powdered with black, while the dash in the submedian fold, and the dark basal-t. a. area plus the dark area distad of the median shade causes the mesal half of the median area to present a strong contrast, appearing as a pale oblique band.

True *H. fasciata* is in the Barnes Collection only from "New Mexico (F. H. Snow)," and High Rolls, New Mexico, Bonniwell.

Type localities and number and sexes of types: Holotype ♂, Ft. Wingate, 8-15 July; Allotype ♀, id., 1-7 July; 2 ♂ Paratypes, id., 24-31 July, 1-7 Aug.; 2 ♂ Paratypes, Jemez Springs, 28 July 1921, (6400 ft.), 24-31 Aug.; 1 ♀ Paratype, id., 16-23 Aug.

Types in: Barnes Collection, except 1 ♂ Paratype, 28 July 1921, received from Mr. Fred Marloff for identification, and returned to him.

Syneda athabasca Neum.

1883, Neum., Papilio, III, 143, *Syneda.*

Mr. Neumoegen states in the original description, "secondaries yellowish white." The types in the Neumoegen Collection appear to have yellowish-white secondaries. A series of specimens from Calgary and Nordegg, Alberta, in the Barnes Collection, vary greatly in the color of the secondaries, but always showing at least a considerable yellowish tinge. The authors are unable to state whether the pale condition of the secondaries of some specimens is the result of fading while the insect is still alive, or while in collections, or due to chemical action of ammonia in poor killing bottles; or if there actually are individual differences.

Syneda athabasca race **crokeri** nov.

A series of eight specimens from Saskatchewan, and three specimens without locality, in the Barnes Collection, do not show the faintest trace of yellow on the secondaries. There are additional specimens in the Brooklyn Museum. It seems impossible that these specimens could have completely lost all trace of yellow, as such a condition is not present in hundreds of specimens of the various species of *Syneda* in the Barnes Collection.

The authors are inclined to consider the white hind-winged form a geographical race, although it appears to be more worthy of specific rank than many of the so-called "species" of *Syneda.* Most, and probably all, of the specimens were collected by A. J. Croker.

Type localities and number and sexes of types: Holotype ♂, Allotype ♀, 3 ♂, 1 ♀, Paratypes, "Sask. Canada, 27-6-07 A. J. Croker"; 1 ♀ Paratype, "Redvers, Sask. 27-6-07"; 1 ♀ Paratype, "Redvers, Sask. 4-6-06 A. J. C."; 1 ♀ Paratype "9-6-06"; and 2 ♀ Paratypes, no data, in Barnes Collection; also a series of specimens from A. J. Croker in the Brooklyn Museum Collection.

Anticarsia schausi sp. nov.

Head, thorax, abdomen and wings concolorous, brownish-rufous, more or less tinged with violaceous.

Primaries: t. a. line waved from costa to inner margin; orbicular a small yellowish dot; median shade line more or less obsolescent in some specimens, in others clearly defined, outwardly oblique from costa to reniform, thence inwardly oblique to inner margin, produced to points on veins 2 and 1; reniform yellowish, erect, narrow, with a black central line; t. p. line erect between costa and radius, excurved to vein 3, thence incurved, produced to a point on vein 1, s. t. line composed of black dots between the veins; terminal series of black dots between the veins connected by a few fuscous scales and a bright rufous line; fringes bright rufous, interlined by violaceous.

Secondaries: with black discal mark and median shade line; a subterminal series of dots corresponding to the s. t. line of the primaries present or absent; terminal line and fringes as on primaries.

Beneath: bright brownish-rufous, maculation similar to the upper side except that the t. a. line is absent and that the other lines and spots are more contrastingly black, more or less outlined by luteous-white; the veins bright red. *Expanse*: 37-40 mm.

The authors are enabled to describe the present species thru the kindness of Mr. Schaus, who supplied a specimen of *A. mixtura* Wlk. = *leucoma* F. F. & R. for comparison. *A. schausi* appears genitalically distinct, its closest ally being *ferruginea* Sm., from which it may be easily recognized, by the reniform being yellowish and not strongly broken by intersecting veins, and by its more even and less patchy appearance.

Type localities and number and sexes of types: Holotype ♂, Palmerlee, Cochise County, Arizona; 3 ♂ Paratypes, id.; 2 ♂ Paratypes, Southern Arizona (Poling); 6 ♂ Paratypes, Huachuca Mts., Arizona, the only dated specimen being from the Huachuca Mts., 8-15 October.

Hemeroplanis finitima race **concoloralis** nov.

Tibiae and underside of the primaries without secondary sexual characters. Head, collar, thorax, abdomen, and ground color of wings, concolorously dull brown.

Primaries: t. a. line blackish, punctiform, almost erect, only slightly incurved in submedian fold; orbicular not present; reniform poorly marked by a few blackish scales; t. p. line yellowish, almost erect from costa to vein 4, incurved in submedian fold, preceded by a punctiform black line; s. t. line punctiform, parallel to the outer margin, marked by black sagittate dashes and small violaceous spots between the veins; a terminal series of faint black dots between the veins; fringe concolorous with the primaries.

Secondaries: similar in color to the primaries, only very slightly paler basally, with an obsolescent discal spot and s. t. shade.

Beneath: primaries: dull brownish with a slight rufous cast; a faint blackish discal spot; median and s. t. shades blackish, parallel to the outer margin. Secondaries: pale, sprinkled with black atoms and strongly tinged with rufous; with blackish discal spot; blackish median and s. t. shades parallel to the outer margin. *Expanse*: 27 mm.

This form has been standing as possibly *H. reversalis* Sm., in the Barnes Collection. Examination of the type of *reversalis* in the Smith Collection proved that *reversalis* was more closely allied to *secundalis*.

Concoloralis is possibly a distinct species with a more northern habitat than *finitima*. The type is the only specimen the authors have seen from so far north in California, and it is not closely approached by over one hundred and thirty specimens representing *finitima* and its various forms. The t. p. line, especially on the underside where it shows as a "median shade," appears a little straighter than in typical *finitima*, and is not excurved below the costa.

As the name is based upon a single specimen, and mainly upon characters which are variable in the group, it appears best to describe it as a northern race of *finitima*. There are probably more names than species in the genus *Hemeroplanis* (=*Pleonectyptera*), but most of the names will eventually have at least "form" status.

Type locality: Shasta Retreat, Siskiyou County, California.

Number and sexes of types: Holotype ♂, 8-15 August, unique.

Metalestra diabolica sp. nov.

Ground color brownish rufous, but so covered with indistinct markings as to appear blackish.

Primaries: basal line rufous, obsolescent except on costa; t. a. line rufous, poorly defined, waved from costa to inner margin; orbicular a small round black dot, often obsolescent; median shade double, more or less diffused in a generally fuscous basal-median system of shades; the area between the median shades and the t. p. line rufous, more or less obscured by fuscous; reniform black, distinct; t. p. line black, produced to blunt points on the veins, rounded from costa, drawn in to a point opposite the cell, this point being marked by a black dot, again excurved to about vein 3, thence incurved to inner margin but interrupted by being produced to a point on vein 1; the t. p. line followed by a rufous shade line in contact with it for its entire length; s. t. line faint, yellowish-rufous, strongly bent inward below costa, opposite the cell, and in the submedian fold; terminal line composed of narrow, black

crescents, the hollows between the veins being filled by yellowish dots; fringe black, more or less checkered by yellowish.

Secondaries: basal area heavily obscured by black shades; discal spot large and black but often difficult to see because of being fused with, and obscured by, the black basal shadings; medial line narrow, black, more or less irregular, outwardly produced opposite the cell; followed by an obsolescent pale shade line; an s. t. intermediate pale shade line; terminal line, yellow dots, and fringes as on the primaries.

Beneath: ground color dirty-yellowish, heavily powdered with fuscous; terminal lines and fringes as on the upper side; primaries with a black discal dot and median shade line; secondaries with blackish discal dot bounded mesially and distally by blackish shade lines which make contact with it, ordinary median shade line black and distinct. *Expanse* 18-23 mm.

This is the *tantillus* of various authors. Specimens were sent to Sir George Hampson, who failed to match it in the British Museum, returning a specimen marked "not *tantillus.*" A specimen of *monodia* agreed with the type of *tantillus.*

It is possible that Grote had a mixed type series as he records *tantillus* from Texas, but his description agrees identically with his type in the British Museum and not with *diabolica,* so the name is restricted to the British Museum type.

Both authors have personally compared specimens, of the two species involved, with the types of *monodia,* and the series of other *Metalestra* in the National Museum, where *diabolica* is placed as *tantillus.* Mr. Schaus kindly informed the junior author that no tropical species entered into the synonymy.

M. diabolica belongs to that group of *Metalestra* which lacks the yellowish dashes on the veins in the s. t. space at the ends of the points of the t. p. line. From *edilis* and *cincta* it may be told by its darker appearance and totally different habitus; from *miserulata* (=*irentis*) by the possession of either a large black discal spot on the secondaries or heavy banding which obscures the spot; while from *tantillus,* its closest ally, by not possessing a nearly unicolorous black appearance only interrupted by narrow broken, but strongly contrasting, whitish-yellow lines.

Type localities and number and sexes of types: Holotype ♂, San Benito, 16-23 June; Allotype ♀, id., 8-15 July; 8 ♂ Paratypes, id., 16-23 June (1); id., Aug. (1); Kerrville, April (2); id., no date (1); Black Jack Springs (1); Brownsville (1); Harris County, 16-23 Sept. (1); 2 ♀ Paratypes, San Benito (1); Brownsville, "5-11," Geo. Dorner (1), all Texas.

Types of all the forms here described as new are in the Barnes collection, unless otherwise stated.

Entomological Uses for Yucca Stems.

By JAMES G. NEEDHAM, Cornell University, Ithaca, New York.

During my year as exchange professor in Pomona College, I lived in the land of magnificent yuccas. They grew sparingly scattered about the mesa near at hand, and more abundantly about the foot of the mountain slopes farther away, rising starkly above the chaparral to a height of 20 or 25 feet, a unique and conspicuous feature of the landscape.

On my first trip out from Claremont to the Cañons in the adjacent San Gabriel mountains in September, I broke off a dead yucca stem and took it home and cut it up in part into sections to be used for pin cushions—a use well known to the general public in yucca-land. Having stock left over, stock that was clean, white, very light in weight, soft and easily worked, I began to find new uses for it. The stems may readily be cut crosswise with a coping saw, or punched lengthwise with any thin-walled tubular instrument, or sliced in any direction with a sharp knife. The stems are commonly 3 to 6 inches in diameter at the base, composed of a thin, tough, yellow rind inclosing a soft white pith, that is easily penetrated or split lengthwise but that holds pins rather well, if they are inserted crosswise. These qualities adapt dry yucca to the following uses:

1. *Pinning blocks*: Short sections of the stem set up on end; these are the entomologists' pin cushions, known and used by many, especially in the southwest. They serve well as depth gauges in setting insects to a proper height on pins, if one grasp the pin heads uniformly and push the pin down through the body of the fresh insect until his finger tip just touches the pith. Glued to a heavier base that will keep them from toppling over, they will receive and hold scalpel, forceps, scissors, needles, etc., as well as pins.

2. *Cyanide caps for the bottom of killing bottles.* For this use the stem is cut lengthwise in thin sheets, say an eighth of an inch in thickness. The sheets are cut into circular discs to fit the inside of the killing bottle *tightly*. Shears will cut them readily. With powdered cyanide of potassium and a little dry

oxalic acid placed in the bottom of the bottle one of these discs is pressed down to the bottom by something having a broad, flat surface (such as the bottom of another smaller bottle) and then a second disc is added with its grain crosswise to that of the first one. The discs undergo compression at the edges and need no glue to keep them in place. They are easiest fitted into large shell vials, but may be bent up at the sides and inserted into any wide-mouth bottle. If smoothly cut the feet of the insect will not catch in them. They are porous, clean and white and easily replaceable. If the top one becomes soiled, a third one may be quickly added, making the bottle as new. They do not add weight, like plaster of paris, and they hold much better than blotting paper discs.

3. *Micro-blocks for pin-point mounting.* Only the finer textured pith is suitable for this; the rapidly-grown, open-meshed basal portion will not hold securely on the pins. Blocks of uniform size are easily obtained by punching suitable pith with a small metal tube, withdrawing the cylinder of pith from the tube and cutting it into pieces of uniform length. Into one of these pieces the micro pin, and the holding pin are inserted in the same way as into cork or paper strips. For a punch I used a 5-inch piece of small, thin-walled brass curtain rod.

4. *Spreading blocks.* These are made by shaving off a tangential lengthwise strip from two opposite faces of a thick block of yucca with a sharp knife, and cutting suitable groove or grooves on each of the two faces. I make the groove by punching out the pith beneath the face (as under 3) and then, with a sharp knife, cutting a slit down into the punched hole of a width adopted to the size of the bodies of the insects whose wings are to be spread. If a downward slope to the sides of the groove is desired it is easily obtained by shaving off the surface with a sharp knife. I make my blocks with a single median groove for macros on one side, and a pair of smaller grooves for micros on the other. The smooth white pith makes a nice soft surface on which to spread the most delicate wings, and it takes pins more readily than soft wood. I have abandoned the use of cumbersome and expensive modern pinning boards altogether.

5. *Small containers for duplicate micros.* When hundreds of parasites and hyperparasites were emerging from some of my rearing cages, and it seemed desirable to save them all, and I was put to it to find time to preserve them all in the usual way, some pieces of yucca pith out of which I had punched micro-blocks (as under 3) lay before me, and I used these for containers. I plugged one end of the hole with a piece of the pith punched from it, put in the freshly killed insects, plugged the other hole with cotton, and wrote the necessary data on the smooth surface of the pith, which takes ink very well. Since then I have sent small specimens of many sorts to specialists in this sort of containers. They may be softened in a water bath and opened by splitting, being of so small value and so easily replaceable.

6. *Small shipping cases for single vials.* Punch a hole to fit the vial lengthwise of a piece of yucca stem, insert the vial with a piece of the pith from the punch replaced in the ends of the hole, wrap, and mail, and save postage.

7. *Tops for small breeding cages.* An inch-long section of a large yucca stem may have the top end of a tin can pressed into it, making a closed cage. If a removable shell vial be first fitted into the yucca cap, the cage will be of the best sort for rearing insects that are attracted to light. The vial may be fitted to the place by using it to punch its own hole, and then removing the plug from its mouth, and then withdrawing the vial till its mouth is on a level with the inner surface of the pith. With a tin can, a pith section and a shell vial at hand such a cage can be made in two minutes. Nothing better can be had for rearing gall-makers, leaf-miners, and other small insects when found in the pupal stage.

This last is the most important use I have found for yucca stems.

The stems should be cut in August, when fully mature and before the rains have come to darken their color, and, of course, stems that are free from the all too frequent holes of burrowing beetles should be selected for these uses.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JANUARY, 1924.

Loan of Types.

Types appear to be the court of last resort in systematic entomology. In the narrow sense they are the property of institutions or individuals. Broadly speaking they are the property of the entomological world at large and the individuals and institutions are holding them in trust for the students of the present and also for those that come after.

If loaned they are subjected to many kinds of risk and not infrequently lost or destroyed.

The systematic worker is often grieved when he is refused the loan of types and seldom considers that future students would apply censure to the owners, if lost or destroyed when loaned out.

If types were loaned, especially by an institution having thousands of them, it would become very burdensome to be sending them whenever there was an application. One distinguished American entomologist said: "If persons are obliged to see my types to identify species, my descriptive work must be faulty and not worth while."

It is a question whether a donor's types should be loaned without his consent if he is living. Not infrequently types are presented with the understanding that they are not to be loaned.

There are some individuals that have no moral sense and who will acquire specimens in any way possible and institutions can't be too careful in such matters.

It is probably safest not to loan types, especially those held as holotypes.—HENRY SKINNER.

Agraulis vanillae Linn. on the Pacific Coast (Lepid.; Nymphalidae).

The late W. G. Wright was mistaken when he wrote in his *Butterflies of the West Coast* that this species was not a native of the West Coast, but was introduced into California following the opening of the Southern Pacific Railroad from New Orleans, about 1885. The butterfly is certainly indigenous to the Mohave and Colorado Desert regions, and as early as 1876

was reported to be very abundant about San Diego. *Vanillae* is very common in Southern California, especially in the hotter fall months, but I have records of it for every month of the year. Above Santa Barbara County it becomes rarer, and I know of only several captures in the San Francisco Bay region. Several years ago I received from Mr. W. J. Chamberlin a specimen of *vanillae* taken at Corvallis, Oregon, in June. Very possibly this example was imported in some early stage on its food-plant.

The species of *Passiflora*, upon which *vanillae* feeds as a larva, are with the exception of a few Malayan, Chinese and Australian species, natives of tropical America. In California the commonest species is *P. caerulea*, and this seems to be the only one that can be grown successfully as far north as San Francisco. Other species are *P. edulis* Sims.; *P. laurifolia* Juss., the Jamaica Honeysuckle or Water Lemon; *P. mollissima* Bailey and the Red Passion Vine, *P. mandicata* Pers. Strangely, still another species, *P. radiata*, perhaps better known as *P. princeps*, appears to be immune from the attacks of the larvae of *vanillae*. I have never been able to locate any larvae on it, and horticulturists tell me that they regard it as caterpillar-proof. I have not been able to locate the food-plant of *vanillae* on the desert regions, but possibly species of *Trifolium* supply food for the larvae, as on several occasions I have noted females hovering about this as though bent on ovipositing.—KARL R. COOLIDGE, Hollywood, California.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

Papers of systematic nature will be found in the paragraph at the end of their respective orders. Those containing descriptions of new genera and species occurring north of Mexico are preceded by an *.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

2—Transactions of The American Entomological Society, Philadelphia. **4**—Canadian Entomologist, Guelph, Canada. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **12**—Journal of Economic Entomology, Concord, N. H. **13**—Journal of Entomology and Zoology, Claremont, Cal. **14**—Proceedings of the Zoological Society of London. **21**—The Ento-

mologist's Record, London. **22**—Bulletin of Entomological Research, London. **40**—Genera Insectorum, Diriges par P. Wytsman. **44**—Ectoparasites. Edited by Jordan & Rothschild, Tring, England. **48**—Wiener Entomologische Zeitung. **49**—Entomologische Mitteilungen, Berlin-Dahlem. **52**—Zoologischer Anzeiger, Leipzig. **61**—Proceedings of the California Academy of Sciences, San Francisco. **68**—Science, Garrison on the Hudson, N. Y. **69**—Comptes Rendus, des Seances de l'Academie des Sciences, Paris. **71**—Novitates Zoologicae, Tring, England. **76**—Nature, London. **82**—The Ohio Journal of Science, Columbus, Ohio. **85**—The Journal of Experimental Zoology, Philadelphia. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **112**—Entomologische Berichten, The Hague. **118**—Die Naturwissenschaften, Berlin. **133**—Zoologica. Scientific Contributions of the New York Zoological Society. **134**—Annales de Biologie Lacustre, Brussels. **147**—Archiv fur Mikroskopische Anatomie und Entwicklungsmechanik, Berlin. **151**—Occasional Papers of the Boston Society of Natural History. **152**—United States Department of Agriculture.

GENERAL. Colledge, W. R.—An interesting insect larva. (Queensland Nat., 1923, 39-40.) **Eggers, F.**—Ergebnisse von untersuchungen am Johnstonschen organ der insekten und ihre bedeutung fur die allgemeine beurteilung der stiftfuhrenden sinnesorgane. **52,** lvii, 224-40. **Finkler, W.**—Die ueberpflanzung von insektenkopfen. **48,** xl, 77-80. Kopftransplantation an insekten. **147,** xcix, 104-133. **Graham, S. A.**—Effect of physical factors in the ecology of certain insects in logs. (Rep. Sta. Ent. Minn., xix, 22-40.) **Horn, W.**—Et meminisse et vaticinari liceat. 14. Ueber "Typen." **49,** xii, 210-13. **Hoyt, W. D.**—Some aspects of the relation of species to their environment. **68,** lvii, 432-4. **Karny, H. H.**—Ueber die anwendung der nomenklaturregeln. **49,** xii, 168-98. **Knoll, F.**—Insekten und blumen. Experimentelle arbeiten zur vertiefung unserer kenntnisse ueber die wechselbeziehungen zwischen pflanzen und tieren. (Abh. Z.-B. Ges. Wien, xii, H. 1-2.) **Rothschild, N. C.**—Obituary. **21,** xxxv, 175-6. **76,** cxii, 697. **Sheppard, T.**—Zoological bibliography. **76,** cxii, 652. **Summers, J. N.**—A refrigerator for shipping live insects. **12,** xvi, 539-43. **Tiegs, O. W.**—Researches on the insect metamorphosis. (Trans. R. Soc. So. Australia, xlvi, 319-527.) **Walton, W. R.**—Some phases of insect parasitism. (Can. Field-Nat., xxxvii, 128-32.) **West & Hull**—List of manuscript bibliographies in the biological sciences. (Rep. & Circ. Ser., Nat. Res. Council, No. 45.)

ANATOMY, PHYSIOLOGY, MEDICAL, ETC. Blunck, H.—Krankheiten, feinde und schmarotzer des gelbrands. **52,** lvii, 296-328. **Mann, M. C.**—A demonstration of the stability of the genes of an inbred stock of Drosophila melanogaster under experimental condition. **85,** xxxviii, 213-44. **Mavor, J. W.**—An effect of X-rays on the linkage of mendelian characters in the first chromosome of Drosophila. (Genetics, viii 355-66.) **Redway, J. W.**—Disease carriers: Biological and geographical. (Ecology, iv, 335-40.) **Stieve, H.**—Neuzeitliche ansichten ueber die bedeutung der chromosomen, unter besonderer berucksichtigung der Drosophilaversuche. (Zeit. f. d. Ges. Anat., Berlin, Abt. 3, xxiv, 491-587.) **Toedtmann, W.**—Die spermatozoen von Gryllotalpa vulgaris. **52,** lvii, 287-91.

ARACHNIDA AND MYRIOPODA. Kastener, A.—Beitrage zur kenntnis der locomotion der Arachniden. **52,** lvii, 247-53.

Chamberlin, R. V.—On four termitophilous millipeds from British Guiana. **133,** iii, 411-21. ***Emerton, J. H.**—New spiders from Canada and the adjoining states, No. 3. **4,** lv, 238-43. **Oudemans, A. C.**—Acarologische aanteekeningen. **112,** vi, 200-8. ***Moore, J. I.**—A review of the present knowledge of fossil scorpions with the description of a new species from Pottsville formation of Clay County, Ind. (Proc. 38 An. Meet. Indiana Ac. Sci., 1922, 125-34.)

THE SMALLER ORDERS OF INSECTA. Brocher, F.—La corne prosternale des larves des Trichopteres. **134,** xii, 83-91. **Hegh, E.**—Les termites, Partie generale. Description, Distribution geographique, Classification, Biologie, Vie sociale, Alimentation, Constructions, Rapports avec le monde exterieur. [Reviewed in Psyche, xxx, Nos. 3-4, p. 133.] **Searle, J.**—The sticktight flea, Echidnophaga gallinacea. (Victorian Nat., xl, 119.)

***Chamberlin, J. C.**—A revision of the genus Anisembia, with description of a n. sp. from the Gulf of California. **61,** xii, 341-51. ***Claassen, P. W.**—News sps. of N. American Plecoptera. **4,** lv, 257-63. **Folsom, J. W.**—A new lepismid from Porto Rico. **10,** xxv, 170. Termitophilous Apterygota from British Guiana. **133,** iii, 385-402. **Silvestri, F.**—Descriptiones termitum in Anglorum Guiana repertorum. **133,** iii, 307-21. **Williamson, E. B.**—Notes on American species of Triacanthagyna and Gynacantha. (Misc. Pub. Univ. Mich., Mus. Zool., No. 9.)

ORTHOPTERA. Bucknell, E. R.—Cyphoderris monstrosa in British Columbia. **4,** lv, 225-30. **Mercier et Poisson,** Contribution a l'etude de l'atrophie des ailes et des muscles

du vol chez les Forficulidae. **69,** 1923, 1142-45. **Seliskar, A.**—Die mannlichen duftorgane der hohlenheuschrecke Troglophilus. **52,** lvii, 245-68. **Weiss, H. B.**—The chinese mantis, a beneficial insect in New Jersey. (N. J. Dept. Agr., Bur. Stat. & Insp., Circ. 68.)

Hebard, M.—Studies in the Dermaptera and Orthoptera of Colombia. Third paper. Orthopterous family Acrididae. **2,** xlix, 165-313.

HEMIPTERA. Cragg, F. W.—Observations on the bionomics of the bed-bug Cimex lectularis, with special reference to the relations of the sexes. (Ind. Jour. Med. Sci., xi, 449-73.) **Knight, H. H.**—Studies on the life history and biology of Perillus bioculatus, including observations on the nature of the color pattern. (Rep. Sta. Ent. Minn., xix, 50-96.) **Readio, P. A.**—The life history of Jalysus spinosus (Neididae). **4,** lv, 230-36.

Chamberlin, J. C.—A systematic monograph of the Tachardiinae or lax insects. (Coccidae). **22,** xiv, 147-212. ***Ferris, G. F.**—Observations on the Chermidae. **4,** lv, 250-56. **Green & Laing.**—Descriptions of some new sps. and some new records of Coccidae.—I. Diaspidinae. **22,** xiv, 123-32. **McAtee, W. L.**—Tingitoidea of the vicinity of Washington, D. C. **10,** xxv, 143-51. **Melichar, L.**—Homoptera. Fam. Acanaloniidae, Flatidae et Ricaniidae. **40,** Fasc. 182, 185 pp. **Morrison, H.**—On three apparently n. sps. of Termitaphis. **133,** iii, 403-8. ***Oestlund, O. W.**—A synoptical key to the Aphididae of Minnesota. (Rep. Sta. Ent. Minn., xix, 114-51.)

***Sanders & DeLong.**—Nine n. sps. of Cicadellidae from the U. S. and Canada. **10,** xxv, 151-56. ***Van Duzee, E. P.**—A new subsp. of Euryophthalmus cinctus. **4,** lv, 270.

LEPIDOPTERA. Bishopp, F. C.—The puss caterpillar and the effects of its sting on man. **152,** Dept. Circ. 288. **Butler, A. G.**—Reversion to ancestral colouration. **9,** lvi, 263. **Crozier, W. J.**—On the locomotion of the larvae of the slug moths (Cochlidiidae). **85,** xxxviii, 323-30. **Meadows, D. C.**—Notes on the lepidoptera of southern California. No. 1. **13,** xv, 33-4.

***Barnes & Benjamin.**—Notes on the egans-group of Oligia (Phalaenidae). **4,** lv, 264-5. **Gibson, A.**—The specific name of the green bud-moth. **4,** lv, 243. **Prout, L. B.**—New Geometridae in the Tring museum. **71,** xxx, 191-215. **Schaus, W.**—A new gen. and sp. of moth of economic interest in the U. S. Nat. Mus. **10,** xxv, 164. **Schaus & Cockerell.**—Three new forms of Rhopalocera from Colombia and a new geometrid moth from Madeira. **10,** xxv, 162-4.

DIPTERA. Hearle, E.—Notes on two mosquitoes from Br. Columbia. **4,** lv, 265-6.

Aldrich, J. M.—The present status of Coquillett's Hypochaeta longicornis. **10,** xxv, 161-2. **Austen, E. E.**—A revision of the family Pantophthalmidae, with descriptions of n. sps. and a n. gen. **14,** 1923, 551-598. ***Cole, F. R.**—Diptera from the islands and adjacent shores of the Gulf of California. **61,** xii, 457-481. ***Curran, C. H.**—A new dolichopodid from Ontario. **4,** lv, 236-7. The genera of the family Blepharoceridae. [Includes key to genera of the World.] A new syrphid from Ontario. **4,** lv, 266-9; 269. ***Garrett, C. B. D.**—Two new D. in the Canadian national collection, Ottawa. New North American D. **4,** lv, 244; 245-6. ***Greene, C. T.**—A new sp. of Volucella. **10,** xxv, 165-8. ***Johnson, C. W.**—New and interesting species of diptera. **151,** v, 69-72. ***Jordan & Rothschild.**—New American Siphonaptera. On the genera Rhopalopsyllus and Parapsyllus. **44,** i, 309-19; 320-70. **Schmitz, H.**—Zwei neue Phoriden aus Australien und Brasilien. **112,** vi, 188-92. ***Van Duzee, M. C.**—Diptera of the family Dolichopodidae, collected on the Katmai expedition. **82,** xxiii, 241-62.

COLEOPTERA. Dodds, C. T.—A list of coleoptera collected on the beach during the summer of 1921 at Laguna Beach, California. **13,** xv, 35-6. **Herrick, G. W.**—Notes on the biology of Desmocerus palliatus. **12,** xvi, 546-8. **Janisch, E.**—Ueber alterserscheinungen bei insekten und ihre bekampfungsphysiologische bedeutung. **118,** 1923, 929-31. **McIndoo, N. E.**—Glandular structure of the abdominal appendages of a termite guest (Spirachtha). **133,** iii, 367-81.

Bernhauer, M.—Neue Staphyliniden aus Sudamerika (29. Stuck). **48,** xl, 49-60. **Hyslop, J. A.**—The present status of the coleopterous family Plastoceridae. **10,** xxv, 156-60. **Mann, W. M.**—New genera and species of termitophilous coleoptera from northern S. Am. **133,** iii, 323-66.

HYMENOPTERA. Caillas, A.—Sur la composition de la propolis des abeilles **69,** 1923, 1145-47. **Howard, L. O.**—A curious phase of parasitism among the parasitic H. **4,** lv, 223-4. **Garlick, W. G.**—Notes on the feeding habits of an adult sawfly. **4,** lv, 256-7. **Logier, S.**—An interesting ant from Muskoka. **4,** lv, 247-9. **Plath, O. E.**—Breeding experiments with confined Bremus (Bombus) queens. **100,** xlv, 325-41.

***Mickel, C. E.**—Preliminary notes on the Mutillidae of Minnesota. (Rep. Sta. Ent., Minn., xix, 97-113.) ***Rohwer, S. A.**—A new Macrocentrus reared from the strawberry leaf roller (Braconidae). **10,** xxv, 168.

SPECIAL NOTICES.

List of manuscript bibliographies in the biological sciences. This is one of the Reprint and Circulars of the National Research Council, No. 45. There are quite a number of entries under Insects; Taxonomy. Also under Entomology: Economic.

Genera Insectorum. This great work published under the direction of P. Wytsman, Tervueren, Belgium, is appearing in about its pre-war frequency. Of course, it is hardly necessary to state that this work should be consulted by all systematists in entomology. The part treating of the homopterous families Acanaloniidae, Flatidae and Ricaniidae, by L. Melichar has just appeared.

Our attention has been called to an error on our part occurring in the November list. Under Arachnida, the following titles should be credited to J. C. Chamberlin: New and little known pseudoscorpions, principally from the islands and adjacent shores of the Gulf of California; and A revision of the genus Anisembia, with descriptions of a new species. The latter should be listed under The Smaller Orders. [If the order had been mentioned in the latter title, this error would probably not have occurred.]

Fossil Insects.[1]

In his day, our own S. H. Scudder was the leading exponent of the science of Palaeoentomology, but the modern representative of Scudder is Dr. A. Handlirsch of Vienna, whose monumental labors have greatly lightened the work of all others concerned with this subject. Not content with having produced that indispensable book, *Die Fossilen Insekten* (1430 pp.; 1906-1908), he has continued along the same lines, and in Schröder's *Handbuch* has given us a new summary, including a considerable amount of previously unpublished material. Even while this was being printed, he returned to his favorite study of the earlier forms, and has produced a *Revision der Paläozoischen Insekten*, published recently in Vienna. The topics dealt with by Handlirsch are so varied, including the whole problem of the descent and phylogenetic classification of the Insecta, that it is impossible to discuss them all in a review. Indeed, the subject re-

[1] Handbuch der Entomologie. By Dr. Chr. Schröder. Lief. 5-7. By A. Handlirsch. Consisting of Chapter 7, pp. 117-306, Palaeontologie, and Chapter 8, Phylogenie oder Stammesgeschichte, pp. 307-376. (Gustav Fischer, Jena: 1920, 1921.)

quires the coöperation of numerous entomologists, and far more analysis will be necessary before a really satisfactory synthesis can be made. It is already apparent that in certain quarters there is a tendency to accept the results of Handlirsch without question, out of regard for his great learning and enormous industry. It is too easily forgotten that such a comprehensive undertaking must necessarily be largely a matter of compilation from sources which are by no means always reliable, and that many judgments are tentative and subject to revision.

For the general entomologist as well as the student of fossils, the treatment in Schröder's *Handbuch* is full of instruction, if taken with sufficient caution. The broad results will stand; many of the details will have to be amended. Although the work is so recent, it was written too long ago to include Tillyard's Australian fossils, the new work on the Gurnet Bay (I. of Wight) fauna, the inclusions in Burmese amber, and various other remarkable discoveries. Among the recorded fossils, are many which on critical examination will need reinterpretation. Thus, Mr. F. W. Edwards, of the British Museum, has very recently reviewed the whole subject of fossil Culicidae or mosquitoes. Handlirsch, with due caution, catalogues the Culicidae from the Mesozoric with a query; and Edwards finds, on looking at the specimens, that it is quite impossible to definitely recognize any of them as belonging to that group. It has lately been reported (Amer. Mus. Novitates, No. 77, 1923) that butterflies and mosquitoes were found in the Ondai Sair formation of Mongolia, which is at least as old as the Cretaceous, and may even be Upper Jurassic. The material is now in my hands for description, and there are no butterflies, while the supposed mosquitoes are apparently Chironomidae.

The difficulty of correctly interpreting insect fossils has led many entomologists to turn away from the study in despair, and I have heard it said that too little reliance could be placed on the published records to render them of any value. This attitude is entirely wrong, overlooking the vast amount of indisputable and significant evidence which throws light on the whole subject of Entomology. Errors which have been made can often be corrected by renewed study, especially when we have more careful morphological treatments of the various parts of modern insects. There is hardly any part of an insect which does not show characteristic features, if we only know what these are, but they must be discovered by intensive comparative studies. Perhaps the most striking result of Paleoentomology is the discovery of the immense antiquity of insect structures, even of existing families and genera. This is now much more impres-

sive since the investigations of the disintegration of radio-active minerals have caused us to greatly increase our estimates of geological time. Why should insect organization be so extremely stable? It is not on account of its simplicity, for an insect is a wonderful and very complex machine. Species of insects appear to be short-lived, as shown by the Pleistocene remains, but genera and families persist while vertebrates change, and mountain ranges are raised up or levelled down. Mr. F. W. Edwards, in a recent study of the Anisopodidae (Rhyphidae), has come to the conclusion that my *Esthereva simplex* from the Colorado Eocene was placed in the wrong family on account of a misinterpretation of the structure of the antennae. I have no doubt that he is correct and that the species must stand as *Olbiogaster simplex*. This is not all; he finds that even the vastly more ancient (Jurassic) *Platyura fittoni* Brodie is to be called *Olbiogaster fittoni*. He did not notice that in the work now reviewed, Handlirsch figures a *Mesorhyphus nanus* from the Jurassic (Upper Lias) of Mecklenburg, and this, by the same tokens, is to be called *Olbiogaster nanus*. Now it is open to any one to say of these Jurassic flies, that probably if we had them alive the palpi, or legs, or thorax would show differential generic characters. This is a matter of speculation, but in any case we have positive evidence of the vast antiquity of the *Olbiogaster* venation. Such a fact is neither doubtful nor insignificant. Contrary to what we might expect, even the pattern of the wings (well shown in many fossils) is extremely stable as to its general character, sometimes more so than venation. It is amazing to find insects as old as the Upper Carboniferous (Pennsylvanian) showing the wing-markings. On p. 154 of the work reviewed, Handlirsch figures a remarkable example of this, *Narkema taeniatum* Handl. from the Pennsylvanian of Illinois. I have examined a second species of this genus, equally well marked, belonging to the Maryland Geological Survey.[2] I find very few misprints or clerical errors, but there is one which should be corrected. *Lithodryas* (p. 273) is a Nymphalid butterfly, not a Geometrid.—T. D. A. COCKERELL.

[2] **Narkema alternatum** n. sp. Resembling *N. taeniatum*, but media branching at a much greater distance from margin; black bands much wider, fully as wide as the intervals between them. Width of bands about 1.85 mm., of intervals about 1.40 mm. Benson's Clay Mine, Big Savage Mt., Mt. Savage fire clay horizon. Maryland.

[The genus *Narkema* is one of those of which Handlirsch is uncertain as to whether they should be referred to the order Protorthoptera or the order Protoblattoidea. See his *Revision der palaeozoischen Insekten*, 1919, pp. 551-552.—ED.]

MacGillivray's External Insect Anatomy.

For the better part of a century taxonomy has been losing caste. It is time we admit this and try to discover the why of the situation. The work is an absolute necessity to many of the other biologic sciences. Its field holds much that is attractive; its methods have great value as training for embryo scientists. If there are adequate reasons for the decadence of systematics, they must lie in the way in which we systematists have been doing things, and the sooner we learn to do them differently the sooner taxonomy will engage the interest and esteem of other biologists.

This is the justification of an adverse criticism of MacGillivray's new book on "External Insect-Anatomy" (1923, Scarab Co., Urbana, Illinois).

The title page states that it is an "introduction to systematic entomology," and the preface adds that "the author in the preparation of this book has had foremost in mind the needs of students," that "a thorough knowledge of the external anatomy of insects is fundamental to their taxonomy," and that the first drafts of the book were laboratory outlines loaned to students. There is no question that this is conceived to be the material which should be presented to a student in insect taxonomy.

In the face of this claim, the book gives no attention to the elucidation of the principles involved in making distinctions, but is concerned with the minute morphology of insects. The student is directed to examine insect after insect in close detail, and then,—to learn names for each minutest structure.

I have had some slight experience with insect morphology; I cannot escape the impression that words, big words, new words, strange and fearful words are the meat and dessert of this new course. Granting that my judgment may not be ripened in wisdom, I still wonder what impression would be made upon a beginner who, perchance, wanders into an entomology course because the University schedule happens to work that way, or because he has a vague but uninformed idea that the insect world might have enchantments worth investigating. He has been told that the out-of-doors is worth a real man's observations; he has heard that ants and wasps and some other small creatures have surprising and entrancing ways. Perhaps the stray student has even tasted the truth of this idea,—just enough to persuade him into a course in insect taxonomy. He understands that in science he will do things very exactly, and will pay attention to many details, but only because these are the stepping stones to knowledge and consequent enjoyment. Don't

doubt for a moment that the student thinks of the goal of it all! He probably knows better than the scientist, for he is not yet lost in minutiae, and he still sees their relation to the rest of life. All of us engaged in teaching ought to remember that the student's viewpoint is liable to be very normal. And so, a normal individual is ready to submit to rigid training. Is he to be satisfied or sufficiently rewarded? Let us begin by introducing him to the "tummy" of a ground beetle, as follows (page 190):

"*Mesosternum*.—The mesosternum is the mesal subtriangular area. The mesocoxacavae are subadjacent and formed by the infolding of the adjacent parts of the mesosternum and metasternum. The mesocoxacoriae are small and concealed in the cephalic part of the mesocoxacavae. The mesocoxae are said to be closed when, as in this insect, they are completely surrounded externally by the mesosternum and metasternum, so that the mesepimera do not reach the mesocoxacavae. The mesosternoideae are completely fused with the mesepisterna. The exposed part of the mesosternum belongs to the mesosternannum. The suture along each lateral margin is a mesotrocasuture. The cephalic* mesosternannum* hyposternum* mesotrocasutures* caudad* mesocoxacava* mesal* mesosternannum* mesocoxacavae* metacoxal* mesofurca* mesopleurademe* mesofurcella* mesofurcinae* mesosternellum* mesotrochantin* mesotrocoila* mesocoxella * * *" and so on to the end of the paragraph! And so on for pages! And so on for 380 pages!

The book might be designed as a study in morphologic homologies. That, it is not, for no adequate studies of embryology or paleontology have been made to warrant such extensive treatments, and the material is so arranged in a running text that it would be difficult to discover any co-ordination which may exist. As a dictionary of terms employed, it is useless. Dictionaries are not written in solid text. Many of the terms are not of accepted standing; they are either quite new, or unusual, or given new meanings. In regard to the latter, on page 254 appears the calm statement that by substituting the new term larvapod, the term proleg is thereby freed for use with an entirely new meaning! Worst of all, most of the technical terms are quite uncalled for. It is getting bad when we have to call a left leg of an insect a "sinistral leg." (At that point the word leg should have been displaced by a new derivative from the Greek, for an insect leg is really not homologous with the mammalian appendage which is properly called a leg!) It is getting worse when the left front leg has to be called the sinistral proleg, when

the middle leg becomes the mesoleg, the hind leg the metaleg, etc., etc. And were I, an humble student, asked to draw the cephalic aspect of the dextral metaleg, I might be tempted to wonder what scientists were anyway, or I might use profanity, —unless my sense of humor survived!

In a very few hours' time one can teach a beginning student enough about the external anatomy of a particular family of insects to have him interpret the taxonomic literature on that group; and that is about all the anatomy he needs in taxonomy until he is ready to make specialized studies in homologies between diverse groups. After the initial lesson, I would engage his time with such exercises as would illustrate and drill him in the principles employed in making keen distinctions. These principles are worth while things in our science, and the only worth-while things beyond the practical utility of the subject in other fields of biology. Teach the student to recognize scant differences, to utilize obscure and varied data, to coordinate conflicting evidence, to know the inadequacies of conclusions, the necessity for wary judgments. This training will do more to make him a good taxonomist than any number of pages of names of morphologic structures. This training will be of inestimable value to the student who enters other fields of research. More, it will be a training fit for the man who has no plans for further study of zoology or botany but who, in the every-day affairs of life, has need of knowing how to make judgments of just the sort which the taxonomist is continually making.—ALFRED C. KINSEY, Indiana University, Bloomington, Indiana.

Doings of Societies.

Entomological Section, Academy of Natural Sciences of Philadelphia.

Meeting held November 16, 1922. Director Philip Laurent presided; nine persons present.

MYRIOPODS.—Dr. Skinner read a letter about an infestation by millipeds of a house at Haverford. Mr. Kisliuk reported an infestation of a field of introduced bleeding-hearts by this pest working in the roots, the entire planting being destroyed.

LEPIDOPTERA.—Mr. Williams made a brief communication on his researches in the lepidopterous family Hesperiidae, showing some important genitalic characteristics.

DIPTERA.—Mr. Cresson spoke about some of the conspicuous

genitalic appendages of the dipterous family Micropezidae, showing a few of the more striking forms.

Mr. Laurent commented on the diversity of terms used for the same parts of the genitalic structure.

Meeting of December 11, 1922. Director Philip Laurent in the chair with 10 persons present.

Mr. R. J. Titherington was nominated for membership.

Dr. Calvert read a paper on the distribution of insects and some theories on evolution which was freely discussed by those present.

The following Officers and Committee were elected to serve for the ensuing year: *Director,* Philip Laurent; *Vice-Director,* Roswell C. Williams; *Secretary,* James A. G. Rehn, *Recorder,* Ezra T. Cresson, Jr.; *Treasurer,* Ezra T. Cresson; *Conservator,* Henry Skinner; *Publication Committee,* E. T. Cresson, Philip P. Calvert, E. T. Cresson, Jr.—E. T. CRESSON, JR., *Recorder.*

Meeting of Jan. 25, 1923. Vice Director R. C. Williams presided; five persons present.

The chairman read a translation of a notice of the death of Dr. Kalman Kertesz, the distinguished Hungarian dipterist and Director of the National Hungarian Museum.

HYMENOPTERA.—A letter from Mr. T. H. Frison, relative to the great value of the collection of Bremidae (Bombidae) at the Academy, was read.

DIPTERA.—Mr. Hornig spoke regarding the presence and emergence of *Musca domestica* on the city dumps as early as the 19th of this month.

ORTHOPTERA.—The same speaker exhibited several slides of the egg-mass of *Tenodera sinensis,* sectioned, showing the method in which the eggs are placed within the mass. Mr. Rehn exhibited several boxes of specimens illustrating certain results of the field work being done in the Orthoptera by Mr. Hebard and himself.

Robert J. Titherington was elected a member.—J. A. G. REHN, *Acting Recorder.*

Meeting of May 24, 1923. Vice-Director R. C. Williams, Jr., presided; eleven persons present.

Dr. Calvert made a brief communication on some early writers on American Entomology, particularly John Bartram and John Banister in and about the year 1700.

ORTHOPTERA.—Mr. Rehn made a few remarks on a recently completed paper on the West Indian Blattidae.

HYMENOPTERA.—Dr. Bradley gave a brief account of his work on a classification of the Hymenoptera, particularly mentioning the ready co-operation given him by several of the world's foremost students in the order. He stated that so far a tentative classification has been reached regarding most of the families. The chair congratulated Dr. Bradley on his success in securing such effective co-operation and on the extent of progress made.—E. T. CRESSON, JR., *Recorder.*

OBITUARY.

MR. PHILIP NELL, who died at his home, 3619 North Marshall Street, Philadelphia, was elected an Associate of The Entomological Section of The Academy of Natural Sciences of Philadelphia, in 1891, and was a subscriber to this journal since its first number.

From the time he was fifteen years of age he was passionately fond of natural history, particularly the study of entomology. After making a general collection for a number of years, he took a special interest in the microlepidoptera and made a large local collection. He was noted for unusual skill in mounting these small and delicate moths. He also made excellent mounting boards, being very handy with tools and made his own boxes for the collection. For a long time he printed pin labels for those interested.

Mr. Nell was a jeweler by trade, but later was connected with the White Dental Company of this city where he was employed twenty-seven years.

He was born in Philadelphia, June 17th, 1857 and died from nephritis, after a short illness, November 7th, 1923, and was buried in Northwood cemetery.—HENRY SKINNER.

EDGAR LEEK DICKERSON

It is with deep regret and a sense of personal loss that I record the death of my friend, Edgar Leek Dickerson, on October 30, 1923, in St. Mary's Hospital, Passaic, New Jersey, following an operation. Burial was made on November 2 in the family plot at Chester, New Jersey. He is survived by his wife, son, mother and two brothers.

Mr. Dickerson was born in Newark, New Jersey, on January 13, 1878, and graduated from the Newark High School in 1898 and from Rutgers College in 1902. According to the minutes of the executive committee of the New Jersey State Board of Agriculture for June 13, 1902, he was appointed as assistant for the summer months to Doctor John B. Smith, State Entomologist. This appointment was made permanent on May 7, 1903, according to the minutes of the committee for that date. From this time until 1911 he was closely associated with Doctor Smith and with the economic entomology of New Jersey. In the reports of the Entomological Department of the New Jersey Agricultural College Experiment Station from 1902 to 1911 frequent mention is made of Mr. Dickerson's entomological activities and duties. In 1911 he resigned and entered the biological department of the Barringer High School, Newark, New Jersey. From here he went in February, 1912, to the Central High School of Newark, where he taught until the time of his death, becoming head of the Department of Biological Sciences and Commercial Geography about 1918 or 1919.

Mr. Dickerson was an ardent collector whenever opportunity afforded and many of the Chester, New Jersey, and other records in *Insects of New Jersey* are due to Mr. Dickerson's activities. During the months of July and August from 1912 until 1915 he was employed by the New Jersey State Board of Agriculture and from 1916 to 1919 by the New Jersey State Department of Agriculture in nursery inspection work dealing both with insects and plant diseases and during this work it was my privilege to spend many pleasant days in Mr. Dickerson's company, collecting insects in various parts of New Jersey and making observations which were subsequently written up and published.

During recent years Mr. Dickerson's interest turned to the Cicadellidae and the distribution of this family in New Jersey, and most of his collecting was done in this group. It was his intention to revise the New Jersey list of these insects when enough material had accumulated and to treat them from a standpoint of geographical distribution.

During his connection with the State Board of Agriculture, he frequently spoke at Farmers' Institutes on economic insects and lectured on entomology in the Short Courses in Agriculture. In addition to his interest in entomology, Mr. Dickerson took considerable interest in civic affairs and was chairman of the Shade Tree Commission in Nutley, New Jersey, where he lived, a member of the consistory of the Franklin Reformed Church of Nutley and chairman of the building committee of the church Community House. He rarely missed a meeting of the New York Entomological Society and often presented papers and took part in the discussions. He was a member of this society for some eighteen years and secretary in 1911. At the time of his death he was a member of the Delta Upsilon Fraternity, the American Association for the Advancement of Science, American Association of Economic Entomologists, Entomological Society of America, New York Entomological Society, Brooklyn Entomological Society, New Jersey Microscopical Society, New Jersey Science Teachers' Association, and the Newark High School Teachers' Association. Mr. Dickerson was the author of some twenty-five papers on entomology which are listed below.

Papers by Mr. E. L. Dickerson.

1904. The Chinese mantis, *Tenodera sinensis* in New Jersey. Rept. Ent. Dept. N. J. Agric. Exp. Sta. pp. 585-587.
1907. The cabbage and onion maggots, with J. B. Smith. Bull. 200 N. J. Agric. Exp. Sta. pp. 1-48.
1910. Notes on *Rhynchites bicolor* Fabr. Jour. Econ. Ent. Vol. 3, pp. 316-317.
1912. The Work of Professor John B. Smith in Economic Entomology. Proc. Staten Is. Asso. Art. & Sci. Vol. IV, Parts I & II, Oct. 1911-May, 1912, pp. 17-24.
1916. Notes on *Leptoypha mutica* Say.* Ent. News XXVII, 308-310.
1916. The Ash leaf bug, *Neoborus amoenus*.* Jour. N. Y. Ent. Soc. XXIV, 302-306.
1917. *Psyllia buxi* Linn. in New Jersey.* Ent. News XXVII, 40-41.
1917. The azalea lace-bug, *Stephanitis pyrioides* Scott.* Ent. News XXVIII, 101-105.

1917. Notes on *Leptobyrsa rhododendri* Horv. Jour. N. Y. Ent. Soc. XXV, 105-112.
1917. *Plagiodera versicolora* Laich, an imported poplar and willow pest.* Canad. Ent. March, 1917, 104-109.
1917. *Idiocerus scurra* Germar, a poplar leafhopper.* Jour. N. Y. Ent. Soc. XXV, 218-224.
1918. The early stages of *Corythucha pergandei* Heid.* Ent. News XXIX, 205-209.
1918. *Popillia japonica* Newm, a recently introduced Japanese pest.* Canad. Ent. Vol. L, 217-221.
1918. Notes on *Trioza alacris* Flor. in New Jersey.* Psyche XXV, 59-63.
1918. The early states of *Empoasca trifasciata* Gill.* Canad. Ent. June, 1918, p. 201-205.
1918. The life history and early stages of *Corythucha parshleyi* Gibson.* Canad. Ent. Dec., 1918, 401-406.
1918. The European mole cricket, *Gryllotalpa gryllotalpa* L., an introduced insect pest.* Jour. N. Y. Ent. Soc. XXVI, 18-23.
1918. *Corythucha spinulosa Gibson*, a new lace-bug on wild cherry.* Ent. News XXIX, pp. 121-125.
1919. The life history and early stages of *Macropsis virescens* var. *graminea* Fabr., a poplar leaf hopper in New Jersey.* Journ. Econ. Ent. XII, 437-440.
1919. Insects of the swamp rose-mallow, *Hibiscus moscheutos* L., in New Jersey.* Jour. N. Y. Ent. Soc. XXVII, 39-68.
1919. Notes on the early stages and life history of *Idiocerus cognatus* Fieb., in New Jersey.* Jour. N. Y. Ent. Soc. XXVII, 129-132.
1919. The life history and early stages of *Platymetopius hyalinus* Osb., a Japanese leaf-hopper in New Jersey.* Annals Ent. Soc. Amer. XII, 369-372.
1920. The Insects of the evening Primroses in New Jersey.* Jour. N. Y. Ent. Soc. XXVIII, 32-74.
1921. Notes on milkweed insects in New Jersey.* Jour. N. Y. Ent. Soc. XXIX, 123-145.
1921. *Gargara genistae* Fabr., a European membracid in New Jersey.* Ent. News XXXII, 108-112.

HARRY B. WEISS, New Brunswick, New Jersey.

* With H. B. Weiss.

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